day91 Arduino coin flip
Monday 5/6/24

Today we're going to use the random function in Arduino to simulate flipping a coin a bunch of times.

Open a new sketch and start by putting your name in a comment at the top. Save it and name it "day91". Then, in setup(), add the line that lets us print:

```
Serial.begin(9600);
```

Also, add the following in setup():

```
randomSeed(analogRead(0));
```

This allows the Arduino to produce nearly random values instead of pseudo-random values. (Without this line, an Arduino will produce the exact same sequence of "random" values every time you run it, not really very random in the end!)

Inside the loop function make a few new variables:

```
int heads = 0;
int tails = 0;
```

Then write a for loop that runs 32000 times, going up by 1:

```
for(int i = 0, i<32000; i++)
```

set up curly braces after the for loop, and inside those add this line:

```
int flip = random(1,3);
```

This stores either a 1 or a 2 in a new variable named **flip**.

Then, use an if/else statement to check if **flip** is equal to 1 or 2. If it is equal to 1, add one to heads, otherwise add 1 to tails. Remember to use == to check if **flip** is equal to 1, not a single equals sign.

After the for loop, report the results like this:

```
Heads: 15947 Tails: 16053
```

This will be several print calls (remember, you can only print one thing at a time with Arduino).

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Upload your program. Open the Serial Monitor. You should see something like this:

```
Heads: 15825 Tails: 16175
Heads: 16038 Tails: 15962
Heads: 15911 Tails: 16089
Heads: 15921 Tails: 16079
```

For me it takes about a second for the Arduino to do each run. (That is the Arduino pretending to flip a coin 32000 times!)

Get this all working before moving on.

The last stage of today's assignment is to keep track of each "round" of coin tosses to generate an overall score. To do this we need two more variables. Add the following ABOVE the setup function so that they are available to us everywhere in the sketch:

```
int rounds = 0;
int headsWins = 0;
```

Now, in the loop function, just before you print the "Heads/Tails" results, add this line:

```
rounds++;
```

This adds one to the **rounds** variable, which will be keeping track of how many times we've done the coin flips. Add print calls so that the Arduino prints this before the heads/tails results:

```
Round 1:
```

Where instead of 1 you are printing the **rounds** variable.

Then AFTER you print the heads/tails info, add an if statement to check if heads won:

```
if(heads>tails)
{
  headsWins++;
}
```

This adds one to the **headsWins** variable every time there were more heads tosses in a round.

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Finally, add print lines to print the following:

```
Overall score: Heads: 149, Tails: 159
```

Except instead of 149 and 159, print **headsWins** and **rounds-headsWins** which is how many Tails wins there have been.

In the end, your output should look like this (except that your results will be random, so they probably will be different from mine):

```
Round 1
Heads: 15902 Tails: 16098
Overall score: Heads: 0, Tails: 1

Round 2
Heads: 15959 Tails: 16041
Overall score: Heads: 0, Tails: 2

Round 3
Heads: 16030 Tails: 15970
Overall score: Heads: 1, Tails: 2
```

Let your program run for a few minutes. Compare your results with someone sitting near you. If you were competing, heads vs. tails, who wins? Do you see a class trend? It should be random, but you never know…

Call me over to check you off, plus turn in your file on the Google Classroom.